Batka, Allan

From: Theodore Pagano, P.E., P.G. <tpagano@mipotash.com>
Sent: Monday, August 17, 2015 7:23 PM
To: Batka, Allan
Subject: Re: FW: Message from "R5-16-21"
Attachments: Letterhead Michigan Potash Operating, Bartka Regarding WHPA August 17th 2015.pdf

Dear Mr. Batka,

Please find attached, an answer to your inquiry regarding wellhead protection.

Sincerely,

Ted Pagano

On Fri, Aug 14, 2015 at 12:46 PM, Batka, Allan <batka.allan@epa.gov> wrote:
Ted, the 3 green shaded areas are the type 2 well head protection areas.

-----Original Message-----
From: R5-16-21@epa.gov [mailto:R5-16-21@epa.gov]
Sent: Friday, August 14, 2015 12:39 PM
To: Batka, Allan
Subject: Message from "R5-16-21"

This E-mail was sent from "R5-16-21" (Aficio MP 6001).

Scan Date: 08.14.2015 13:39:18 (-0400)
Queries to: R5-16-21@epa.gov

MICHIGAN POTASH OPERATING, LLC

August 17th, 2015

Mr. Alan Batka
Class I Well Permitting
UIC Branch (WU-16J)
US EPA Region 5
77 W. Jackson Blvd
Chicago, IL 60604-3590

RE: Definition and Clarification of Type 2 Wellhead Protection Area
Sent: VIA E-MAIL

Dear Mr. Batka:

You have identified; visually, a map showing a "Type 2 Provisional Wellhead Protection Area ('PROVISIONAL') sourced from the GIS database from the Michigan DEQ GeoWebFace, and asked for further clarification as it concerns such.

The PROVISIONAL shapes you reference, are associated with water supply serial number ('WSSN') 2015567, permitted by Kalium Chemicals and its successor in interest, The Mosaic Company. This WSSN and associated groundwater extraction wells accommodate the groundwater supply needs for the industrial processes and other water requirements of the Hersey Potash and Salt Facility located at 11461 S 135th Avenue, Hersey Michigan. These wells are included in Section C.5 of the Class I Non-Hazardous Permit application.

A PROVISIONAL area is differentiated from an established Wellhead Protection Area (WHPA), where a PROVISIONAL area is a theoretical delineation based on the Michigan Groundwater Management Tool (MGMT) that utilizes available data to identify a theoretical 10-year capture radius around a public water supply well.

In this particular case, the 10 year capture area shown, is for the industrial and Type 2 Non-transient, non-community public water supply wells serving the needs of the Hersey Potash and Salt Facility (water supply serial number 2015567).

The intent of the PROVISIONAL area excersize is to utilize existing data to facilitate a further understanding of public water supply with database tools, and where applicable, encourage the pursuit of a traditional WHPA. In collaboration with Michigan State University, the Michigan Department of Environmental Quality catalogued 1,434 Type 2 Provisional WHPAs and placed them on the Michigan DEQ GeoWebFace.

In this particular instance, the database referenced the industrial process and Type II non-transient, non community classification associated with the Kalium Chemical and Mosaic water supply wells.

Please find attached, for further reference:

(1) the Michigan Wellhead Protection Program Guide; and
(2) a presentation by Michigan State University concerning PROVISIONAL determination and purpose; and
(3) a presentation by the MDEQ concerning PROVISIONAL determination and purpose.

Please feel free to contact me directly with comments, questions, or concerns.

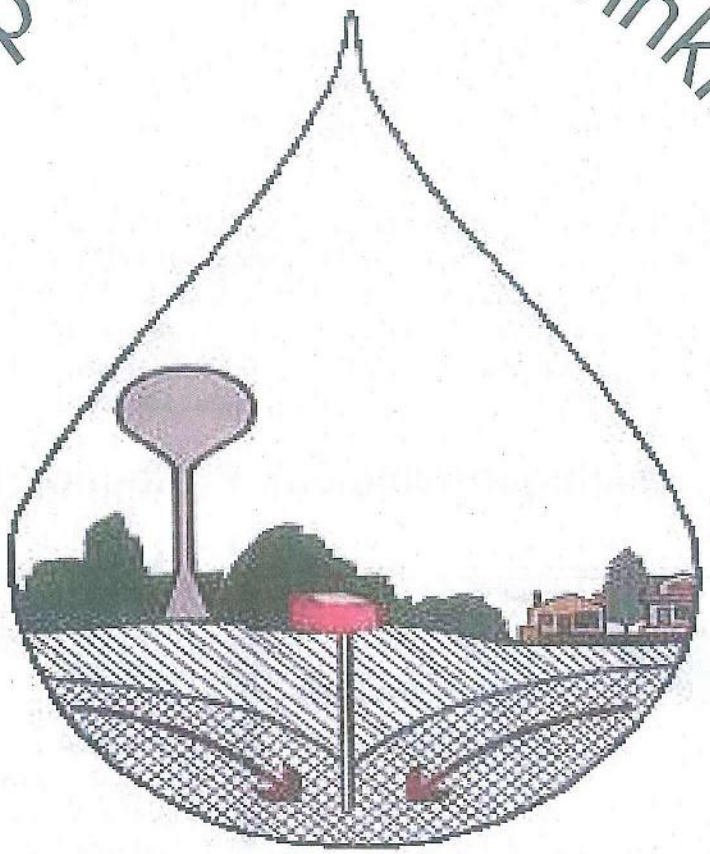
1225 17th Street, Suite 2200, c/o Fox Rothschild
Denver, CO 80202, USA

Sincerely,

Theodore Pagano, P.E., P.G.
Manager
Michigan Potash Operating LLC

1225 17th Street, Suite 2200, c/o Fox Rothschild
Denver, CO 80202, USA

Teaming Up for Quality Drinking Water



DEQ

The Michigan Wellhead Protection Program Guide

Michigan Department of Environmental Quality
Drinking Water & Environmental Health Section
February 2006

State of Michigan
Jennifer Granholm, Governor

Department of Environmental Quality
Steven E. Chester, Director
Environmental Assistance Center 1-800-662-9278
Web site: www.michigan.gov/deq

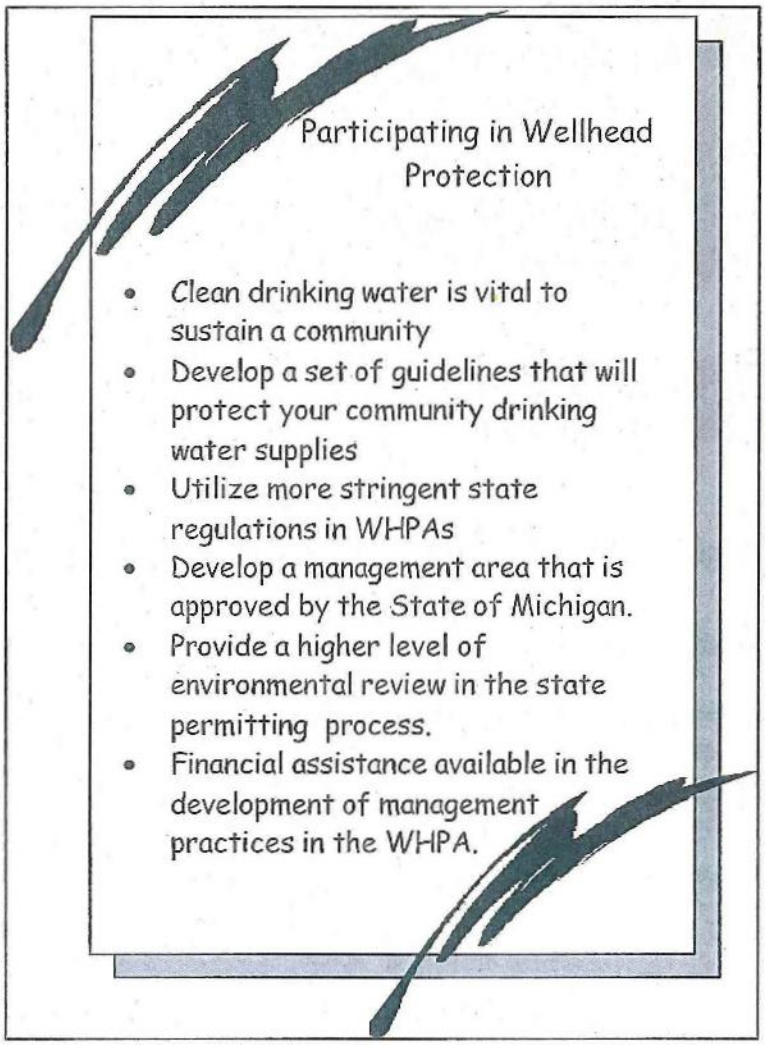
EQC 2102 (02/2006)

A Guide to Protecting Your Community's Drinking Water

This guidebook is intended for local government staff, leaders, and community volunteers who have an interest in community development, environmental protection, and drinking water quality. Information on basic groundwater principles and the importance of participating in the Michigan Wellhead Protection Program (WHPP) are provided.

The WHPP involves activities and management practices for protecting public groundwater supply systems from contamination. Wellhead protection is an ongoing processe that will help your community have control over its future environment. Your involvement and commitment to helping ensure a safe and reliable source of drinking water is vital. By participating in the Michigan WHPP, your community will effectively manage and thus protect your public drinking water source.

The Michigan Wellhead Protection Program



Michigan's groundwater is used for drinking water by nearly half of the state's population. In addition, it is used for irrigation and industrial purposes and contributes to the economy and unique quality of life in our Great Lakes State. In an effort to safeguard public water supply systems (PWSS) from contamination, the federal Safe Drinking Water Act (SDWA), 1976 PA 399, was amended in 1986 to include wellhead protection. Through these amendments Michigan implemented a voluntary, statewide WHPP. Michigan's WHPP is composed of a set of guidelines that help communities protect their drinking water by identifying the area that contributes groundwater to PWSS wells, identifying sources of contamination within that area, and developing methods to cooperatively manage the area and minimize the threat to the PWSS.

Unlike many programs, wellhead protection is voluntary and implemented at the local level through the coordination of activities by local, county, regional, and state agencies. Although the program is voluntary, communities who choose to develop a state approved WHPP, must develop a local WHPP consistent with the guidelines established by the state. Local WHPPs specifically address seven elements, which include:

1. **Roles and Responsibilities**—identify individuals responsible for the development, implementation, and long-term maintenance of the local WHPP.
2. **Wellhead Protection Area Delineation**—determine that area which contributes groundwater to a PWSS well.
3. **Potential Sources of Contamination**—identify known and potential sites of contamination within the Wellhead Protection Area (WHPA) and include in a contaminant inventory list.
4. **Wellhead Protection Area Management**—provide mechanisms which will reduce the risk of existing and potential sources of contamination from reaching the public water supply well or wellfield.
5. **Contingency Plan**—develop an effective contingency plan in case of a water supply emergency.
6. **New Wells**—provide information on existing groundwater availability, the ability of the PWSS to meet present and future demands, and the vulnerability of the existing wells to contamination.
7. **Public Education and Outreach**—generate community awareness in wellhead protection by focusing on public education and the dissemination of wellhead protection information.

The Michigan Wellhead Protection Grant Program

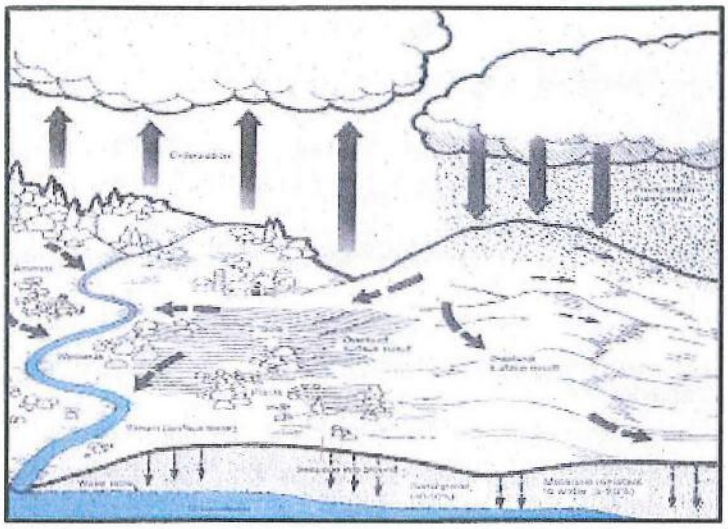
Funding for WHPP activities is available through a state grant program and is designed to assist communities in the development and implementation of WHPPs. Within the grant program, the state funds 50 percent of eligible grant activities while the other 50 percent is matched with local funds. Grant money is awarded each year to PWSSs *based on a scoring system that ranks communities of similar size.*

Groundwater Basics

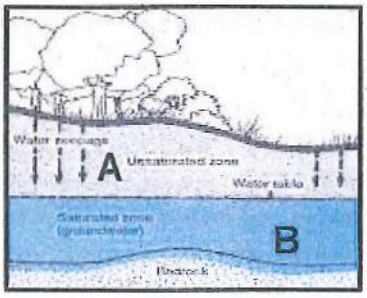
Before going into detail about the WHPP, it is important to understand the mechanics of groundwater. This section will give you the basic information you need to understand why you should participate in the WHPP.

Ground water myth #1
Groundwater is a large underground lake or river.
Reality: Groundwater is stored in small spaces between rock or soil particles.

The Water Cycle



Groundwater begins with rain and snowmelt that seeps or infiltrates into the ground as gravity pulls it downward. The type of land surface determines how much water will infiltrate into the ground. The amount of water that infiltrates into the ground varies from 5 percent to 50 percent, with the remaining water running off the land surface into streams, rivers, and lakes or returning to the atmosphere by evaporation.



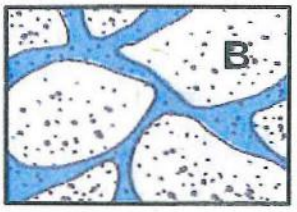
Saturated and Unsaturated Zones

Subsurface Water

Groundwater is present in geological formations below the land surface (subsurface). The subsurface can be divided into two zones, the unsaturated zone and the saturated zone. As water infiltrates into the ground it will travel through material that has open spaces between particles called pore spaces. Pore spaces are small to microscopic in size.

Unsaturated pore spaces

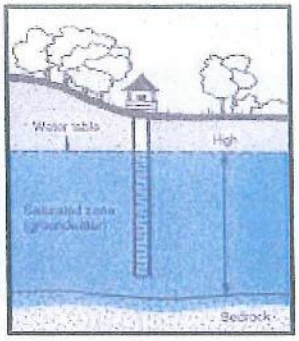
The first zone that infiltrating water intercepts is the unsaturated zone (A). In the unsaturated zone the pore spaces are filled with both water and air. Plant roots can capture moisture moving through this zone but it does not contain enough water to supply a well. The movement of water through this zone is vertical.



Saturated pore spaces

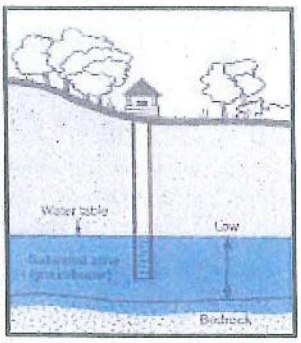
As the water infiltrates through this material it will eventually begin to build up, filling the pore spaces completely with water. The zone where pore spaces contain only water is called the saturated zone (B). Water flows both horizontally and vertically in the saturated zone. It is from the saturated zone that we can withdraw groundwater for our use.

The Water Table



Seasonal high water table

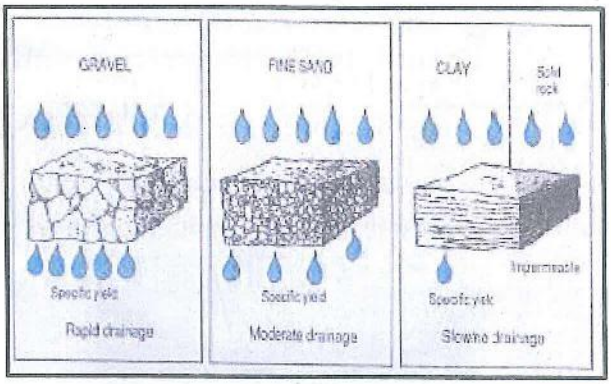
The boundary between the unsaturated and the saturated zone is called the water table. The water table is not a flat surface but a surface with high and low spots that generally follow the features of the land. The water table rises and falls according to the season of the year. Typically the water table is higher in the early spring and lower in late summer.



Seasonal low water table

Aquifers

Aquifer is the term that is used to describe a formation that stores groundwater in a usable and sustainable quantity. Drinking water comes from groundwater that is extracted from an aquifer. The aquifer can be made of a wide range of materials and may be at any depth. An aquifer's size and areal extent can vary widely. Some aquifers are found only locally where others are found throughout a region. In Michigan, aquifers are classified as confined or unconfined. The material that overlays the aquifer determines the type of aquifer.



Water travel through different materials: gravel, fine sand and clay.

Confined Aquifers

Groundwater does not move easily through layers of material that have very small, unconnected pore spaces. This layer is called an impermeable layer. When there is a thick impermeable layer it becomes a confining layer. When found between the land surface and your drinking water aquifer, it acts as a barrier that adds a natural layer of protection to your aquifer. The confining layer slows the travel of contamination from activities on the land surface to your aquifer. While the confining layer provides extra protection, contamination can still travel into your aquifer via fractures and abandoned wells.

Ground water myth #2

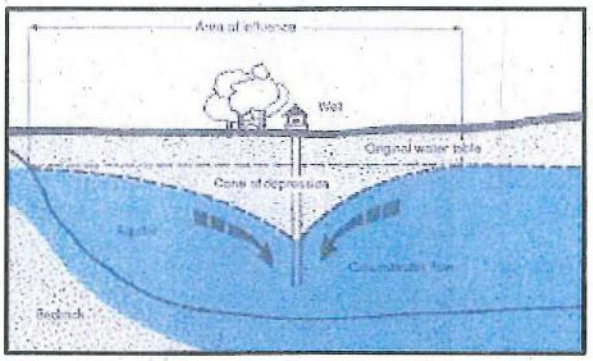
Groundwater does not move or groundwater moves very fast. Reality: Groundwater moves very slowly from a few inches to a few feet per day.

Unconfined Aquifers

Unconfined aquifers are aquifers that do not have an impermeable layer between the land surface and the aquifer. When a confining layer is not present there is no barrier to slow the travel of contamination between the surface and your aquifer. Unconfined aquifers are very sensitive to activities on the surface and are at a high risk of contamination.

The Cone of Depression

When water is pumped out of an aquifer, the water table will dip down around the well. This is called the cone of depression. Because water is being pumped out of the aquifer the speed of the water begins to increase as it approaches the pumping well. As you get farther away from the well the flow begins to decrease back to the natural flow rate.



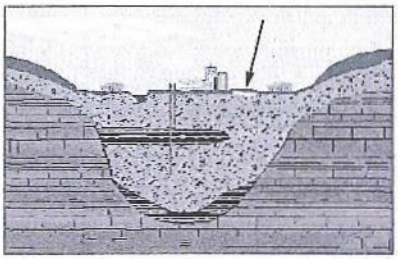
The cone of depression

Ground water myth #3
There is a lot of groundwater.
reality: Groundwater is about 0.7 percent of all the water on earth and not all of that is good for, or available for, drinking water.

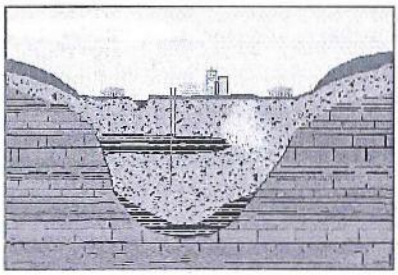
Aquifers are a complex system with many factors that influence the groundwater quality. Once an aquifer is contaminated it is very difficult and expensive to clean up and virtually impossible to return it to its original state.

Example of a Contamination Event

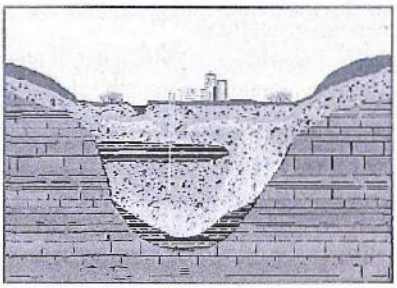
The following example will give you a visualization of how surface activities can contaminate your drinking water supply.



1) The picture is a representation of an aquifer with an incomplete confining layer (dark black bands). There are two wells, a shallow well above the partial confining layer and a deep well below the partial confining layer. The arrow points to a chemical spill that occurred on the surface.



2) One of the unique properties of water is that it can dissolve and carry many kinds of material. Because of this, chemical spills on the surface (solid or liquid) can be carried into the aquifer when water comes in contact with them. Once the contamination mixes with the water it becomes very mobile and will travel with the groundwater.

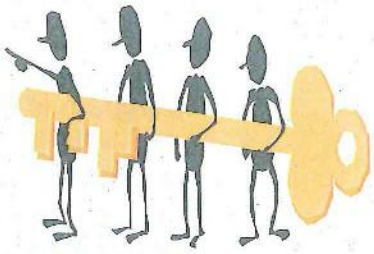


3) Once the contamination reaches the groundwater it spreads through the aquifer. Because withdrawing groundwater increases its flow or movement, it may actually cause the contamination to move more rapidly towards your drinking water well. The final outcome may be contamination being pulled into the drinking water well and ultimately into the public water supply system.

Now that you have a basic understanding of what you are protecting, we will continue on to the elements of the WHPP and show you how they will help you protect your drinking water supply.

The Seven Elements of Wellhead Protection

1) Roles and Responsibilities



The first step in developing a successful WHPP is to build a team of people that want to play an important role in protecting your public water supply. When building a team, you want to include participants that have a variety of experiences. A great team will consist representatives from your local municipality, fire department, and health department along with others involved in area businesses, schools, environmental organizations, planning agencies, and citizens (within your community and those residing in adjacent communities).

Important Team Members

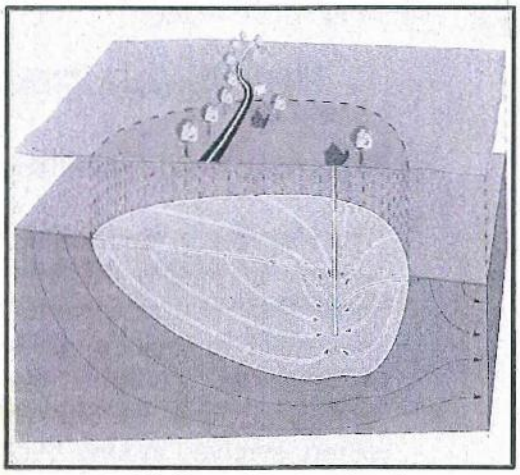
- ✓ Local Manager
- ✓ Water Superintendent
- ✓ Fire Department
- ✓ Health Department
- ✓ Planning Department
- ✓ Business and Industry
- ✓ Agriculture
- ✓ Education
- ✓ Environmental Organization
- ✓ General Public

Being a part of the wellhead protection team will give you an opportunity to participate in protecting your drinking water supply as well as give you the chance to share information with your peers about the program, hopefully getting them interested in wellhead protection. By now, you are probably asking..."Why should I be a wellhead protection team member?" Well, being a part of the team allows you to gain valuable knowledge about your drinking water and more importantly, you have the opportunity to make decisions that can keep your drinking water free of contamination and safe for you and your family. Building an effective wellhead protection team will also help to ensure your program's continuation and success.

The next step of team development is determining, within your local government, who will be responsible for what aspects of the program. For instance, who will be the community contact for questions about the program? Who will keep the program updated? Who will organize wellhead protection events in your community? What will be the responsibilities of each of the groups represented on the team? There are outside organizations that can help with your wellhead protection efforts and can also be listed and used as a resource for your community.

2) Determining the Wellhead Protection Area (WHPA)

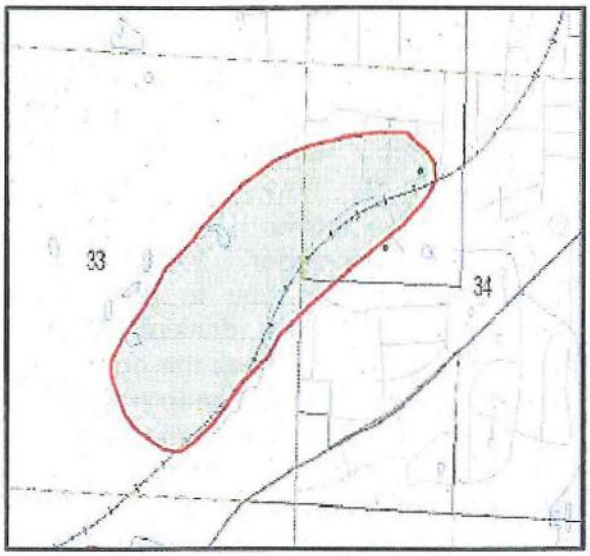
Q: What is a WHPA?
A: The surface area that overlies the aquifer that is directly contributing water to your well.



3-D Wellhead Protection Area

The WHPA is the physical area your program is going to manage. Determining the WHPA is done through a scientific process that takes into account the characteristics of the aquifer from which you withdraw your drinking water.

The WHPA is determined by pumping the well for 24 or 72 hours to determine how much water is available and the speed at which it is moving. The groundwater flow direction in the area is determined by taking static water elevations in surrounding wells. Collecting static water elevations will tell you at what level the water table is found and will help determine the natural slope of that three dimensional surface. Once these two things have been completed, the information is entered into a computer modeling program that scientifically determines the 10-year time of travel.



Wellhead Protection Area Map
Source: DEQ

The 10-year tme of travel boundary marks the time it will take a particle of water to travel through the WHPA and into the well. Ten years is the time period selected by Michigan because it provides a reasonable length of time for responding to environmental problems within a WHPA that is of a size that can be reasonably managed.

The WHPA is determined and is submitted to the Michigan Department of Environmental Quality (DEQ) for approval. Once approved, the WHPA receives a higher level of environmental monitoring at the state level for certain activities which are permitted through the state. For example, an underground storage tank must have an extra layer of protection around the tank (secondary containment), or businesses with groundwater discharge permits may need to perform more frequent monitoring. As stated previously, the WHPP does not exclude any businesses or activities from your WHPA.

3) Contaminant Source Inventory

Once the Wellhead Protection Area has been completed and approved by the DEQ, the next step in the program is to identify sites within the WHPA that may have the potential of contaminating your drinking water supply. Because both surface and subsurface activities can impact the drinking water supply, it is important to know what activities are occurring in your wellhead protection area. The inventory will provide a basis for a management plan that will address current issues in your WHPA.

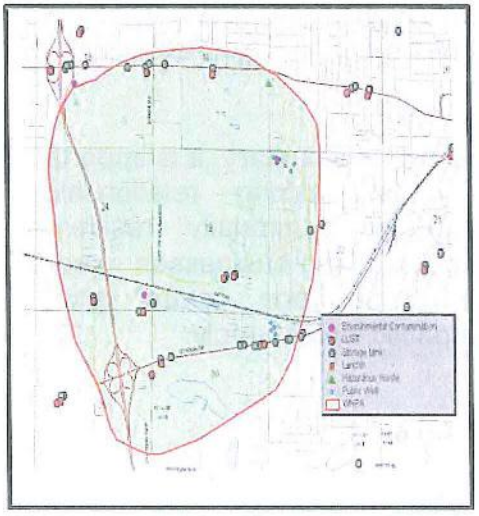
Creating a list and map of all potential and known sites of environmental contamination within your WHPA is one such way to protect your drinking water supply. Existing and known sites of environmental contamination may include:

- ✓ Leaking Storage Tanks
- ✓ Superfund Sites
- ✓ Part 201 (contamination) sites of Act 451—
- ✓ Oil and Gas Spills
- ✓ Others

> Proper management of hazardous materials can effectively reduce the threat to your drinking water supply.

In addition, potential sites of environmental contamination may include:

- ✓ Registered Storage Tanks
- ✓ Hazardous Waste Generators
- ✓ Ground Water Discharges
- ✓ Agricultural Operations
- ✓ Septic Systems or Dry Wells
- ✓ Commercial Facilities
- ✓ Manufacturing and Industrial Facilities
- ✓ Institutional Facilities
- ✓ Utility Companies
- ✓ Abandoned Wells



Source: DEQ

Once these sites are identified and mapped, you will have the basis for deciding how the management portion of your WHPP should be designed. In addition, your contaminant source inventory will provide you with a list of businesses to include as part of your WHPP team.

It is important to educate facilities which handle and store hazardous materials so they are aware of the location of their business or facility in relation to the drinking water supply. They may be unaware that they are located directly over the area that contributes to the water they drink. As part of the wellhead protection team, business leaders feel included in the process, offer ideas, and bring a new perspective to the table. Businesses will gain valuable information for improving management of hazardous materials and protecting the water they drink. The proper management of hazardous materials can effectively reduce the threat of contamination to the drinking water supply.

4) Wellhead Protection Area Management

In order for a WHPP to protect your community's drinking water it is important to set up management practices that will allow for the development of your community without jeopardizing water quality.

> Community leaders and businesses need to work together towards one central goal—protecting your public water supply.

Management strategies are developed entirely by the community to fit the community's needs. Strategies such as site plan review, zoning, ordinances, land use planning, and the incorporation of wellhead protection into the Master Plan or Comprehensive Plan are tools that communities can develop and use to insure the future quality of their drinking water supply.

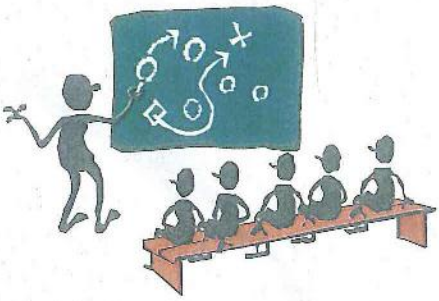
It is important that staff involved in the planning aspect of the community participate in the wellhead protection efforts, since they will be responsible for making sure that the management strategies for wellhead protection are followed during the planning process.

In addition to setting up management strategies on a planning level, management techniques should be made available for businesses handling and storing hazardous materials. There are many free or low cost programs available through the DEQ Environmental Assistance Division that will actually help business become more environmentally safe and add cost savings as well. These programs are not regulatory programs.

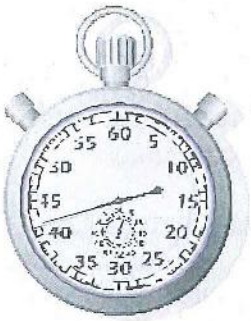
Management of your WHPA also needs to occur at the residential level. Educating residents about the proper use and application of common household chemicals and hosting a household hazardous waste collection day are two examples of residential management.

Because the WHPP is voluntary, it is important to establish good working relationships. Community leaders, community residents, agricultural producers, and businesses need to work together toward one central goal—protecting your public water supply.

5) Contingency Plan



A contingency plan will help safeguard your community in the event of a water supply emergency. The plan will include personnel, testing equipment, procedures, and materials that are necessary and identify where they are located in order to quickly and effectively correct the water supply emergency. A response protocol, notification procedures, and methods that can be used in handling emergencies based upon the nature of the threat to the PWSS are also included. These elements are important and necessary during a water supply emergency because you will be prepared and ready for action.



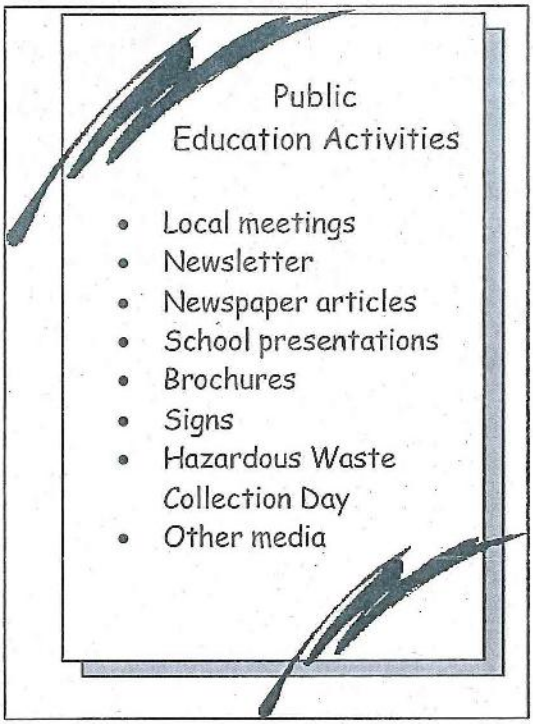
Should your well be impacted by contamination, the contingency plan will provide a course of action that identifies the procedure for containing or isolating the impacted well within the water supply. Once a well is impacted, a community must have a quick response time. An alternative water supply and/or an external source of water such as bulk or bottled water are identified in the contingency plan. The plan will also include how the community will be notified of an emergency and who will be in charge of notifying others. The plan is intended to have response protocol, personnel, and equipment in place prior to a contamination event so the community can react quickly.

6) New Wells

Your wellhead protection activities provide an excellent assessment of your public water supply system by collecting information on existing groundwater availability, the ability of your well(s) to meet present demands, and the vulnerability of your existing wells to contamination. If your community has had a water supply expansion, an increase in water use, or if existing wells are highly vulnerable to contamination, you will consider a plan that focuses on the future development of wells. A plan will be created that describes why your community has decided to expand production, how you plan to expand (e.g., location of additional well(s), proposed depth, capacity) and a timetable for when you plan to delineate any newly installed wells.

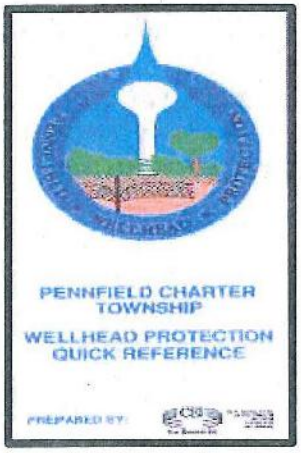
If new municipal wells are constructed within your community, it is strongly recommended that you integrate them into the WHPP. At the time of construction, the WHPA is easier and less costly to delineate. In addition, wellhead protection can be used to evaluate the availability of groundwater at a particular site.

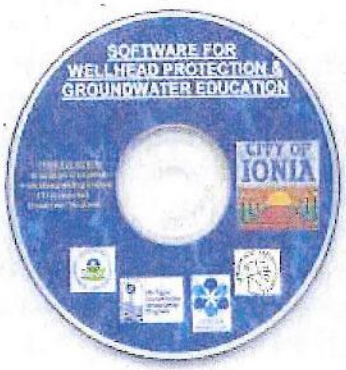
7) Public Education and Participation

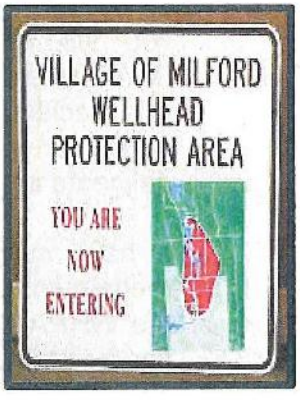


Educating your community members and encouraging them to participate in your drinking water protection efforts is essential. Why should you educate your community on the importance of wellhead protection? First, having the support of those who live, work and own businesses in your WHPA will ensure the program's success and longevity. Second, a successful program equals a better managed public water supply system which lessens the likelihood of drinking water contamination. Third, in the event of an emergency, your community will be better prepared and equipped to deal with the contamination problem. Therefore, it is critical to gather support and interest from all within your community.

To generate interest in wellhead protection, your community may wish to focus on public education and distribute wellhead protection information. Presentations can be made at your local meetings, before your boards and commissions, and at your schools. Sending out wellhead protection newsletters and brochures, hosting radio and cable television spots, posting signs in your WHPA, organizing a hazardous waste collection day, writing an article for your local newspaper, or setting up a WHPP booth at the local fair are other ideas. In addition, distributing WHPP mugs, hats, placemats, shirts, coloring books, and other advertising paraphernalia are also effective. Educating those who live within and around your WHPA is a vital step in the protection of your water supply.







Examples of Wellhead Protection Outreach Products (Source: DEQ)

Benefits of Wellhead Protection

In addition to protecting your groundwater, the WHPP also provides a number of other benefits. Your community will develop a management area that is approved by the state of Michigan.

Communities with a WHPP receive a higher level of environmental review in the state permitting process. In addition, permitting for underground and aboveground storage tanks, spillage of polluting materials, and discharging to groundwater include more stringent requirements within WHPAs. Consequently, communities that have designated WHPAs are able to better safeguard their groundwater from contamination. Financial assistance is also available for the development of management practices (e.g., planning and zoning) and the searching and plugging of abandoned wells within the WHPA.

The state WHPP does not dictate what businesses can or cannot locate within the wellhead protection area, nor does it prevent the use or storage of hazardous materials in the wellhead protection area. It is the responsibility of the local unit of government to determine how to protect the water supply through planning, zoning, and proper management techniques. These techniques need to be developed by your community and designed to fit your community's needs. Implementing and enforcing these higher level management techniques will provide your community with the power to protect your public water supply systems.

Summary

A safe and reliable source of drinking water is essential for life. Because our water supply is limited, it needs to be properly managed. The proper management of public water supplies is an ongoing process that requires future planning. Implementing a WHPP is a cost-effective way for communities to protect the health of their citizens and the natural resources of Michigan.

For further information, please contact:

Michigan Department of Environmental Quality
Water Bureau
Drinking Water and Environmental Health Section
Source Water Protection Unit
P.O. Box 30273
Lansing, MI 48909
Telephone: 517-241-1355

MICHIGAN STATE UNIVERSITY

Protecting Public Groundwater Supplies Using the Michigan Groundwater Management Tool (MGMT)

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Institute of Water Research *and*

Department of Community Sustainability

Project Collaborators

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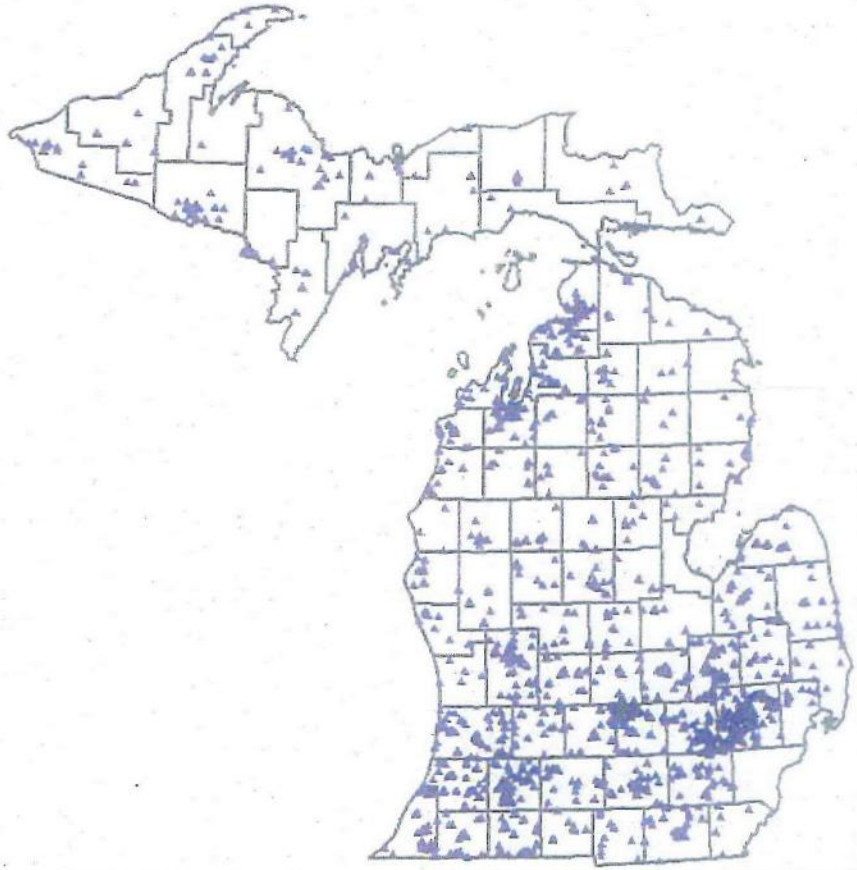
Brant Fisher – MDEQ SWP Program

Wayne Kukuk – MDEQ SWP Program

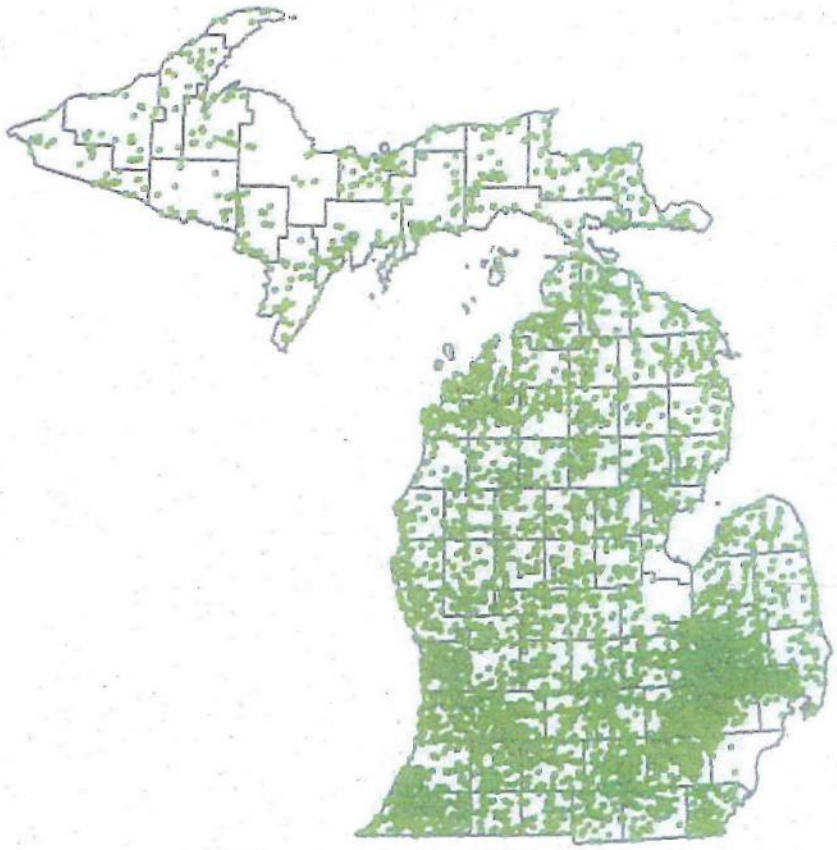
GW-Dependent Community Public Water Supply Wells

- ~1126 individual PWSSs
- ~3400 supply wells
- Year-round service to minimum of 25 persons or 15 living units.
- Ex: municipalities, apartments, nursing homes, manufactured housing

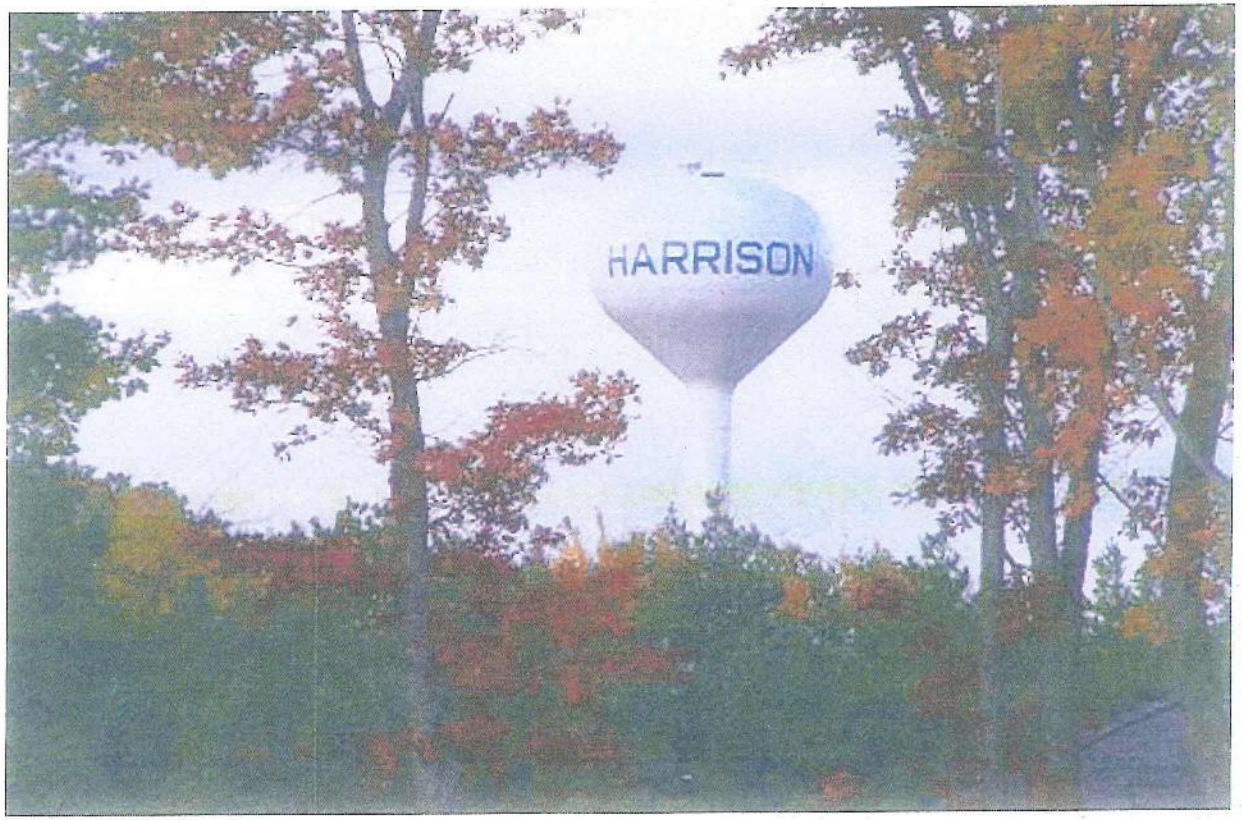


GW-Dependent Noncommunity Public Water Supply Wells

- ~11,700 Noncommunity supply wells (~1,700 nontransient)
- Provides service to not less than 25 people or 15 living units for at least 60 days per year.
- Ex: churches, schools, restaurants, retail stores, offices, etc.

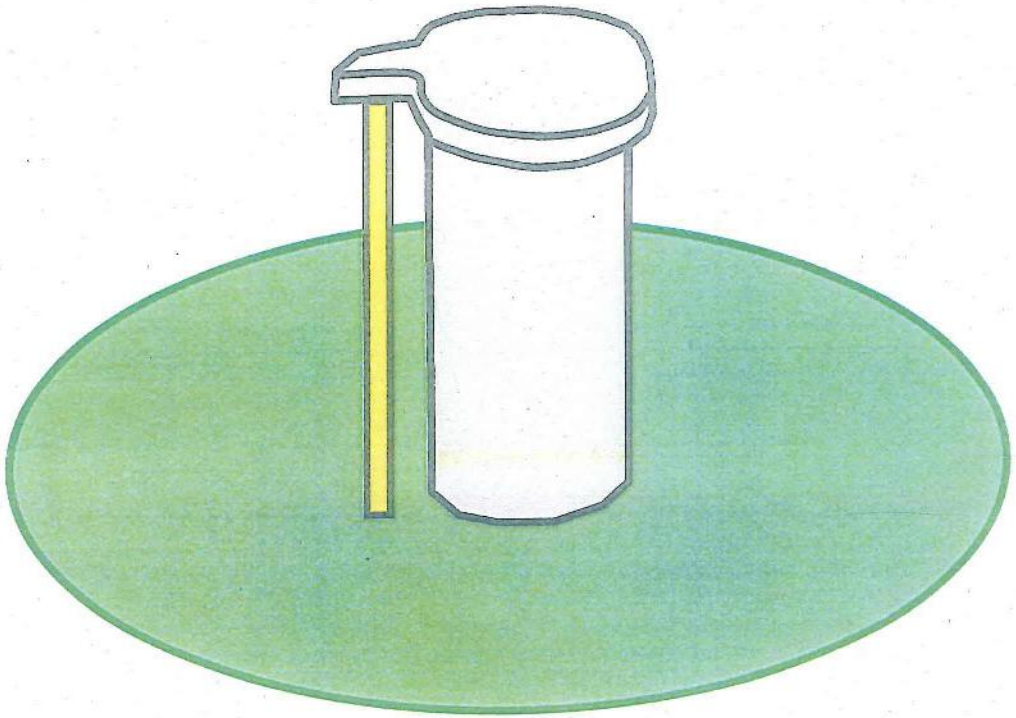


How do we protect public groundwater supplies?



Traditional Approach to Groundwater Protection

- Maintain isolation distance from major and minor contamination sources

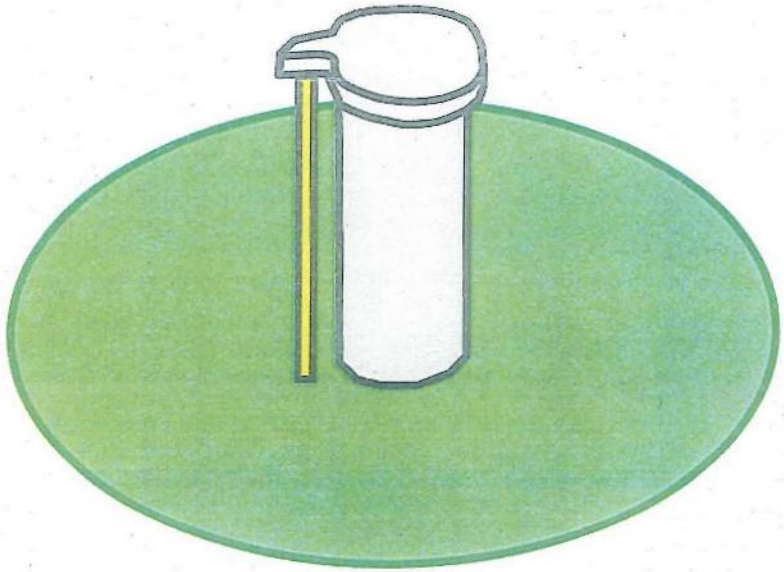


Noncommunity – 800/75 feet standard isolation
Community – 2000/200 feet standard isolation

Is this adequate protection?

- If you can control land-use within isolation circle

- Doesn't provide protection from problems moving toward well



Michigan Wellhead Protection Program

- 1986 amendments to the federal Safe Drinking Water Act required states to develop WHPPs
- Delineate the area that contributes groundwater to water-supply system wells
- Identify sources of contamination within that area
- Develop methods to manage the area (e.g. land-use restrictions) to minimize the threat to the water supply

Wellhead Protection Area (WHPA)

The surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield

State Wellhead Protection Programs

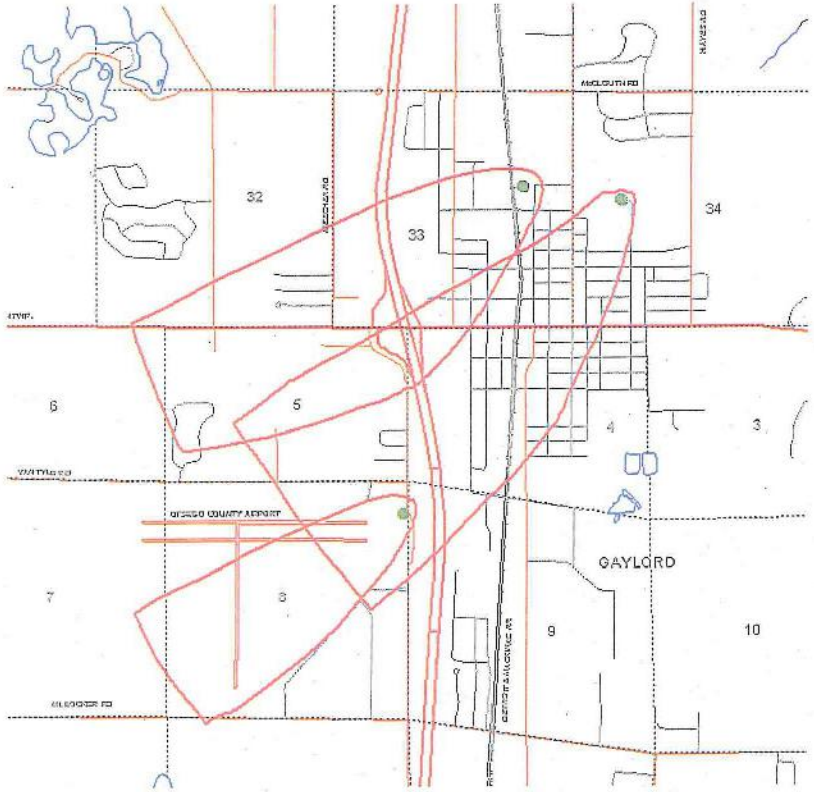
- Many states still use radial isolation distance (fixed radius)
  - Illinois (Phase 1) - 1000 ft
  - Missouri - 3000 ft
  - New Hampshire – 2640 ft (½ mi)

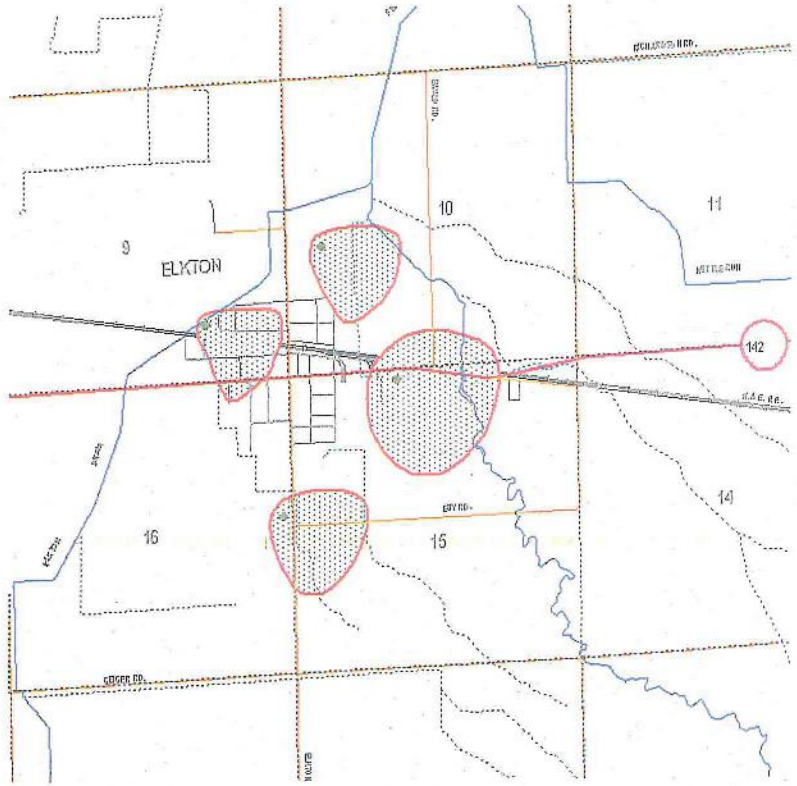
- Michigan has always based its WHP program on understanding the groundwater system
- Area to be protected is based on GW flow fundamentals

What information is needed to delineate a WHPA?

- Well Location
- GW Elevation Map
  - Measure GW Elevations
- Hydraulic Conductivity
  - Conduct aquifer test
- Pumping Rate

WHPA Delineations





10-year Time of Travel is determined by groundwater flow direction and velocity